Draft - Material used by Esaias at First Plenary 10/29

MOCEAN GROUP REPORT

October 29, 1992

FIRST JOINT SEAWIFS - MODIS MEETING

SeaWiFS is 44 weeks from launch. Lack of knowledge of launch year budgets is disturbing. Science Team Selection is imminent. Science Team meeting tentatively scheduled for Jan 12 - 14 1992.

WHITE PAPER STATUS

The group went over the outline and two sections with the SeaWiFS contingent. Mark Abbott is awaiting input from more team members. Complete draft available by mid-December for review at the SeaWiFS Science Team meeting.

OVERALL REVIEW OF DESCOPES AND PRODUCTS

The concern is that there is still no mechanism at the EOS Program level to weigh instrument, science, and EOSDIS capabilities with respect to a cost constrained system.

INSTRUMENT DESCOPE PRIORITIES

16. Polarization - Retain specification and put it lower on the list of priorities. Potential for some relief dependent upon further studies if the sun scan is the side impacted.

12. SRCA has gained importance for radiometric calibration as a result of descoping the ground calibration.

15. SDSM. Keeping the SDSM is essential - make it a low item on the list. The filters in the SDSM need to be tested for vacuum shift effects like the focal plane filters.

8. Registration

Most ocean color heritage is with CZCS, which had nearly full registration due to its spectrometer design. Experience with AVHRR is more relevant to MODIS, and some problems are experienced in high gradient regions due to mis-registration. SeaWiFS registration is expected to be about 0.1 pixel, with 0.3 pixel spec. Relaxation of MODIS pixel registration to 0.2 pixel is reluctantly acceptable in order to meet cost constraints, given the point spread function and the generally low within scene variability at the top of the ocean atmosphere. However good registration is important, and we offer the following guidance for alignment of specific bands and regions of focal planes.

Guidance :

• Visible and Near IR focal planes should be given greatest attention. In particular alignment of bands 9, 12, 13, 14 are most important for ocean color.

• Rotations should be minimized because ratios of bands 8-10 to 11 and 12 form the primary geophysical relationships of interest.

• Alignment of 15 & 16 with 8-10 is also important for atmospheric corrections.

• Can positions of 11 and 12 be reversed?

• Relative alignment of 20, 22, 23, 31, 32 is most important in the thermal for SST.

• Commandable along scan registration is potentially bothersome. If it does make a difference to more than one data set, then changing it will affect the time series accuracy.

7. Registration to 0.5 pixel is unacceptable.

In general we would go fishing sooner than the listing recommended.

OPERABILITY

For channels 22 and 23, the sub-pixel approach is recommended. The narrower footprint will aid in partly cloudy tropical regions where these bands are especially important for SST. The size of the sub-pixel element should be such that there is some 5% overlap at the band edges (the diagram meets this criterion).

1.38 u BAND

It would be highly desirable to have a good cirrus detector. On the other hand this may add cost, and characteristics of another channel would be affected. No changes can be tolerated in characteristics of 22 or 23 apart from those necessary for operability. Channel 20, which is also of interest to SST to retain the 15 year heritage of AVHRR. Provided the detector could work up to 500K, and that there is no decrease in characteristics of the SNR and data within the environmental range 265 to 320 K, necessary changes to channel 20 could be considered. It may not be possible to do this.

PM ORBITS

It is essential that a more complete suite of studies be performed, which include wind speed dependent glint patterns, to select optimal phasing between AM and PM platforms as well as nodal crossing. The studies need to consider actual water-

leaving radiance levels, attaining global coverage rapidly outside of glint impacted areas, climatological wind fields, and

DUTY CYCLE

The duty cycle for daylight mode should be increased to allow collection of data to the terminators at equinox and to the terminator in the northern hemisphere at winter solstice and likewise for the summer solstice and summer hemisphere.

DIRECT BROADCAST

Direct broadcast at L-band (HRPT-like) of a selected subset of MODIS bands would be very useful way to take advantage of the considerable world-wide ground station capability.

MASKING ALGORITHMS

The Science Team is very dependent upon MCST performing essential calibration and characterization studies. An example is intraband detector calibration and normalization. Diluting this effort with some masking work seems counter productive.

There are a number of masks which can only be developed within the framework of specific geophysical algorithms, since the mask threshold must be carefully evaluated against the algorithm error terms. These include various cloud masks, glint masks, water depth, for example.

There are other masks which are relatively independent of algorithms, and MCST could provide these masks with little effort. These include the CIA world data base for coastlines, calculated terminators, and the like.

Following development of the algorithm dependent masks, it would be highly desirable to collate these masks under a single product line, as well as including them in the individual products.

LEVEL 1B PRODUCTS

Once again we feel that the heritage of CZCS, AVHRR's SeaWiFS is that a table of sensor counts and calibration tables or equations is most appropriate to the MODIS problem. This is not the case for higher resolution sensors. Level 1A data is preferred over Level 1B. All calibrations will be done retrospectively, necessitating recalculation of Level 1B products, probably several times per year, in contrast to providing new calibration tables.

SIMULATED DATA MODELS

The understanding and model frameworks exist to produce realistic simulated data sets for various geometries, atmospheric conditions, surface conditions, and water bio-optical characteristics. Additionally, real SeaWiFS data is expected in a year. If greater network bandwidth existed between Miami and the OSU CM-5, the group would be able to perform the sensitivity studies required to utilize the much more complex algorithms required for MODIS ocean color atmospheric and foam correction. Implementing the planned T-3 connectivity between MOCEAN members is required ASAP in order to provide the realistic simulated data sets for the oceans. This is somewhat sooner than we had planned in the execution phase proposals.

PEER REVIEW

Work continues on the ocean algorithm document, with revisions derived from the most recent revision of product listings and research findings. The SeaWiFS relevant algorithms and in-water validation program developed by MODIS team members will be presented to the ~ 50 member SeaWiFS Science Team meeting in January. Alternate arrangements will be made to cover the non-SeaWiFS algorithms (e.g. SST, Fluorescence). CZCS vicarious calibration article is in manuscript form. Additionally, the algorithms are being documented in a series of technical reports and peer-reviewed articles.